App. No. 10/826,508
Office Action Dated July 8, 2005

REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1, 5, 7, 9, and 11 are hereby amended. Claims 4, 6, 8, and 10 are canceled without prejudice or disclaimer.

The amendment of claim 1, reciting "wherein the copper is contained in an amount of 5 to 45 atom %", is supported by the subject matter of claim 4. The amendment of claim 1, reciting "the tin is contained in an amount of 30 to 90 atom %", is supported by the subject matter of claim 6. The amendment of claim 1, reciting "the third metal is contained in an amount of 2 to 45 atom %", is supported by the subject matter of claim 8. The amendment of claim 1, reciting "the bonding layer has a thickness of not less than 0.001 μm and not more than 0.5 μm", is supported by the subject matter of claim 10. Claims 5, 7, 9, and 11 are amended to correct dependencies.

Claims 1-11 were rejected as being unpatentable over Fujiwara (US 6,329,074). Applicants traverse this rejection. Fujiwara does not suggest a bonding layer comprising an alloy wherein copper is contained in an amount of 5 to 45 atom %, tin is contained in an amount of 30 to 90 atom %, and a third metal is contained in an amount of 2 to 45 atom %, as required by claim 1. Since tin is contained in an amount of 30 to 90 atom %, in claim 1 tin composes a significant amount of the bonding layer. Although Fujiwara does not disclose the content range of each metal, the reference contains information sufficient to show that the reference actually teaches away from the alloy of claim 1. Fujiwara teaches tin being present in the range of 1 to 20mg/m^2, which is less than the ranges of zinc and nickel (both at 1 to 30mg/m^2). See column 4, lines 40-67. Further, Fujiwara teaches a weight ratio of zinc to tin being 20/1 to 1/20, preferably 10/2 to 4/10 (see column 5, lines 1-3). Therefore, Fujiwara does not teach an alloy where tin is the present in the significant amounts required by claim 1.

Further, Fujiwara does not suggest a bonding layer comprising an alloy of copper, tin, and one metal (third metal) selected from the group consisting of: silver, zinc, aluminum, bismuth, cobalt, and nickel, as required by claim 1. Rather than an alloy of three metals, as

required by claim 1, Fujiwara teaches a rust inhibitor layer formed from an alloy of four metals (copper, tin, zinc, and nickel). The alloy of claim 1, containing the required three metals, in the required ratios discussed previously, improves adhesion to resin. In contrast, the quaternary alloy layer disclosed by Fujiwara provides a barrier effect against acid.

Even further, one knowledgeable in the art would not look to Fujiwara to teach an alloy useful for an adhesive layer to resin, as required by claim 1. In fact, Fujiwara discloses a silane agent layer (4) to compensate for lack of adhesive strength of the alloy layer (2) and the chromate layer (3). See column 4, lines 35-37, column 6, lines 20-22, and Figure 2. Fujiwara discloses that the alloy layer (rust inhibitor layer) provides acid resistance and thus can prevent corrosion of a metal surface due to acid, causing deterioration of bond strength to resin. Fujiwara, however, does not suggest that the alloy layer itself enhances bond strength to resin. In contrast, the bonding layer alloy of claim 1 provides enhanced bond strength to resin, thereby eliminating the need for an additional layer, such as the silane agent layer (4) or the chromate layer (3) taught by Fujiwara.

Favorable reconsideration of claims 1-11 is requested.

Claims 1-10 were rejected as being unpatentable over Sugawara (US 6,180,174). Applicants traverse this rejection. Sugawara does not suggest a bonding layer comprising an alloy wherein copper is contained in an amount of 5 to 45 atom %, tin is contained in an amount of 30 to 90 atom %, and a third metal contained in an amount of 2 to 45 atom %, as required by claim 1. Rather, Sugawara teaches coated copper alloy formed by coating the copper alloy with tin, where the copper alloy comprises 1 to 41 wt % zinc and 0.01 to 9 wt % total of one or more of elements selected from the group consisting of Fe, Ni, Sn, Al, Co, Ti, Cr, Mg, Si, and P, with the balance being copper, so that a copper-tin alloy is formed at an interface between the tin coating and the copper alloy (see column 2, line 64 to column 3, line 3). As previously noted regarding Fujiwara, the metal ratios of claim 1 improve adhesion to resin. Since Sugawara does not suggest the claimed metals and associated ratios, the bonding layer alloy of claim 1 must be considered unobvious over Sugawara.

Further, one knowledgeable in the art would not look to Sugawara to teach the alloy of claim 1. The claimed alloy is useful for bonding to resin. Sugawara teaches a hard alloy that

App. No. 10/826,508
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would be suitable on surfaces of electronic parts requiring abrasion resistance such as surfaces of a socket and a battery terminal. Nothing in Sugawara provides any basis to expect the enhanced bonding to resin provided by the alloy of claim 1.

Favorable reconsideration of claims 1-10 is requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions regarding this communication can be directed to the undersigned attorney, Douglas P. Mueller, Reg. No. 30,300, at (612)455-3804.

Respectfully Submitted,

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Douglas P. Mueller
Reg. No.: 30,300
Hamre, Schumann, Mueller & Larson, P.C.
225 South Sixth Street
Suite 2650
Minneapolis, MN 55402
612.455.3800

DPM:mfe